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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,706	03/19/2004	Mark Fimoff	7229	7522
28574	7590	05/23/2007		
ZENITH ELECTRONICS CORPORATION 2000 MILLBROOK DRIVE LINCOLNSHIRE, IL 60069				
			EXAMINER EJAZ, NAHEED	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 05/23/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

5

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/804,706	FIMOFF ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Naheed Ejaz	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-20 is/are allowed.
- 6) ☒ Claim(s) 21 and 29 is/are rejected.
- 7) ☐ Claim(s) 22-28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Abstract*

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. Abstract is objected to because it contains the words 'comprises' (page # 43, line 6) and 'means' (page # 43, line 10). Correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (7,136,410) in view of Jäverbring (6,381,271) and further in view of Bingham et al. (4,422,175) (hereinafter, Choi, Javerbring & Bingham respectively).
5. As per claim 21, Choi teaches single and multiple constraint criterion filters coefficient updaters (figure 3 & 4, elements 413 & 415) which calculates the  $w_{mi} (n+1)$

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constraint tap weights (col.3, lines 29-35) which depends on the input error signal  $e_{ml}(n)$  (figure 3 & 4) (claimed 'determining a constraint value M as a function of the estimated error' & 'determining constrained tap weights based on the channel impulse response and a tap weight constraint function having the constraint value M' since calculation of constraint weight depends not only on the input error signal but also input signals from mean channel estimator (figures 3 & 4, elements 412 & 414). Furthermore, it is noted that claimed 'tap weight constraint function having the constraint value M' is determined by estimating the error (claim 21, lines 1-2) therefore, the input error signal into block 413 & 415 of Choi is considered to be equivalent to the claim limitations of determining constrained tap weights based on tap weight constraint function having the constraint value M).

Although Choi teaches adaptive filter (figure 3 & 4, elements 411) and his calculation of constraint weight tap based on the values from mean channel estimator but he does not explicitly teach impulse response and decision feedback equalizer.

Javerbring determines channel impulse response of a channel through which the decision feedback equalizer receives a signal (figure 1b, col.1, lines 39-63, col.3, lines 4-23) (figure 2).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Javerbring into Choi in order to enable equalizer to minimize symbol sequence error according to the generated estimated symbols by calculating impulse response thus provide optimum performance as taught by Javerbring (col.1, lines 45-55).

Choi and Javerbring do not teach estimation of an error at the output of the decision feedback equalizer and supply constraint tap weights to the decision feedback equalizer.

Bingham discloses, 'estimating an error at the output of the decision feedback equalizer' (figure 2, elements 20, 22, 24b, 28) (figure 3, elements 20, 22, 24b, 28a & 28b, col.9, lines 34-68, col.10, lines 1-30) & 'supplying the constrained tap weights to the decision feedback equalizer' (figure 3, elements 20, 60, 68a, 70, col.2, lines 20-28 & 40-43, col.9, lines 34-68, col.10, lines 1-18).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Bingham into Choi and Javerbring in order to correct amplitude distortion as taught by Bingham (col.3, lines 12-16).

6. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (7,136,410) in views of Jäverbring (6,381,271), Bingham et al.(4,422,175), as applied claim 21 above, and further in view of Gozzo (5,513,214).

6. As per claim 29, Choi, Javerbring and Bingham teach all the limitations in the previous claim on which claim 29 depends but they fail to disclose mean squared error at the output of the decision feedback equalizer.

Gozzo teaches, 'estimating a mean squared error at the output of the decision feedback equalizer' (figures 2 & 8, col.3, lines 33-37, col.5, lines 25-62).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Gozzo into Choi, Javerbring and Bingham in

order to have optimal truncation of channel impulse response based on mean square error criterion as taught by Gozzo (col.3, lines 38-44).

***Allowable Subject Matter***

2. Claims 1-20 are allowed.

3. The following is a statement of reasons for the indication of allowable subject matter:

3. With respect to claim 1, the prior art of record fails to teach or suggest a method of supplying tap weights to taps of a decision feedback equalizer comprising: determining constrained tap weights based on the channel impulse response and a differentiable tap weight constraint function, wherein the differentiable tap weight constraint function is an approximation of a non-differentiable tap weight constraint function as recited in the claim 1 and in combination with other elements in the claim.

4. With respect to claim 13, the prior art of record fails to teach or suggest a decision feedback equalizer comprising: a tap weight determiner that determines constrained tap weights and unconstrained tap weights in response to the output of the decision device and the signal to be equalized in order to minimize the mean squared error between the transmitted symbols and the output of the decision feedback equalizer, wherein the constrained tap weights are determined by constraining the minimum mean squared error subject to a tap weight constraint function, wherein the tap weight constraint function is differentiable and is an approximation of a non-differentiable tap weight constraint function, and wherein the tap determiner supplies the constrained tap weights to the taps of the feedback filter and the unconstrained tap

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weights to the taps of the feed forward filter as recited in the claim 13 and in combination with other elements in the claim.

5. Claims 22-28 are objected to as being dependent upon a rejected base claim, claim 21 but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Guren (4,985,902) teaches decision feedback equalizer and a method of operating a decision feedback equalizer.
- Cideciyan et al. (6,222,879) disclose self contained equalization method and apparatus.

### ***Contact Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

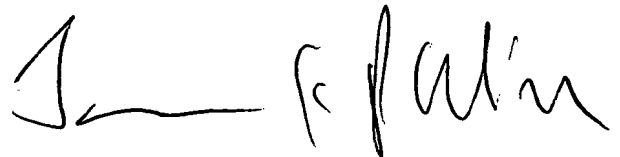
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NE

5/16/2007

Naheed Ejaz  
Examiner  
Art Unit 2611

A handwritten signature in black ink, appearing to read "Jay K. Patel", written in a cursive style.

JAY K. PATEL  
SUPERVISORY PATENT EXAMINER